

## CLAIMS

1. A process for producing bis- $\beta$ -hydroxyethyl terephthalate and/or a low condensate thereof from an aromatic polyester, comprising the steps of:

heating the aromatic polyester comprising terephthalic acid as a main dicarboxylic acid component and ethylene glycol as a main glycol component together with bis- $\beta$ -hydroxyethyl terephthalate and/or a low condensate thereof to pre-decompose the aromatic polyester; and then,

reacting the obtained pre-decomposed product with ethylene glycol to convert the terephthalic acid component of the pre-decomposed product into bis- $\beta$ -hydroxyethyl terephthalate and/or a low condensate thereof.

15

2. The process of claim 1, wherein the pre-decomposition is carried out by heating the bis- $\beta$ -hydroxyethyl terephthalate and/or low condensate thereof to melt.

3. The process of claim 1, wherein the pre-decomposition is carried out at a temperature of 150 to 265°C.

4. The process of claim 1, wherein the pre-decomposition is carried out using 0.1 to 4.5 parts by weight of the bis- $\beta$ -hydroxyethyl terephthalate and/or condensate thereof based on 1 part by weight of the aromatic polyester.

5. The process of claim 1, wherein a reaction between the pre-decomposed product and ethylene glycol is carried out at a temperature of 190 to 265°C.

6. The process of claim 1, wherein a reaction between the pre-decomposed product and ethylene glycol is carried out using 1 part by weight of the pre-decomposed product and 0.3

to 10.0 parts by weight of ethylene glycol.

7. A process for producing bis- $\beta$ -hydroxyethyl terephthalate having a small content of ions, comprising the  
5 step of:

bringing a bis- $\beta$ -hydroxyethyl terephthalate solution composition comprising ethylene glycol, bis- $\beta$ -hydroxyethyl terephthalate and cations and/or anions as impurities into contact with a cation exchanger and/or an anion exchanger to  
10 reduce the total content of cations and anions as impurities to 50 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

8. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl terephthalate solution composition contains cations and/or  
15 anions as impurities in a total amount of 3,000 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

9. The process of claim 7, wherein the content of cations  
20 contained as impurities in the bis- $\beta$ -hydroxyethyl terephthalate solution composition is 2,500 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

10. The process of claim 7, wherein the content of anions  
25 contained as impurities in the bis- $\beta$ -hydroxyethyl terephthalate solution composition is 500 ppm or less based on the bis- $\beta$ -hydroxyethyl terephthalate.

11. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl terephthalate solution composition contains bis- $\beta$ -  
30 hydroxyethyl terephthalate in an amount of 5 to 80 wt%.

12. The process of claim 7, wherein the cation exchanger is a cation exchange resin.

13. The process of claim 7, wherein the anion exchanger is an anion exchange resin.

5 14. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl terephthalate solution composition is brought into contact with a cation exchanger and then with an anion exchanger.

10 15. The process of claim 7, wherein the bis- $\beta$ -hydroxyethyl terephthalate solution composition is brought into contact with a cation exchanger and/or an anion exchanger at a temperature of 20 to 120°C.

15 16. A process for purifying bis- $\beta$ -hydroxyethyl terephthalate comprising the steps of:

(1) obtaining a crude bis- $\beta$ -hydroxyethyl terephthalate by subjecting a bis- $\beta$ -hydroxyethyl terephthalate-containing mixture containing cations and anions in a total amount of 50 ppm or less, ethylene glycol in an amount of more than 10 wt% and a compound having a boiling point lower than that of bis- $\beta$ -hydroxyethyl terephthalate to preliminary evaporation or distillation to distill off the compound having a boiling point lower than that of bis- $\beta$ -hydroxyethyl terephthalate; and then,

25 (2) subjecting the crude bis- $\beta$ -hydroxyethyl terephthalate to evaporation or distillation under reduced pressure to separate purified bis- $\beta$ -hydroxyethyl terephthalate.

30 17. The purification process of claim 16, wherein the preliminary evaporation or distillation is carried out at a temperature of 170°C or less.

18. The purification process of claim 16, wherein the

preliminary evaporation or distillation is carried out at a reduced pressure (absolute pressure) of 40,000 Pa (300 mmHg) or less.

- 5 19. The purification process of claim 16, wherein the content of ethylene glycol in the crude bis- $\beta$ -hydroxyethyl terephthalate is reduced to 10 wt% or less by the preliminary evaporation or distillation.
- 10 20. The purification process of claim 16, wherein the evaporation or distillation under reduced pressure is carried out at a temperature of 130 to 250°C.
- 15 21. The purification process of claim 16, wherein the evaporation or distillation under reduced pressure is carried out at a reduced pressure (absolute pressure) of 300 Pa (2.25 mmHg) or less.
- 20 22. A process for purifying bis- $\beta$ -hydroxyethyl terephthalate comprising the step of:  
subjecting crude bis- $\beta$ -hydroxyethyl terephthalate having a cation and anion total content of 50 ppm or less to evaporation or distillation under reduced pressure.
- 25 23. The purification process of claim 22, wherein the evaporation or distillation is carried out at a temperature of 130 to 250°C.
- 30 24. The purification process of claim 22, wherein the evaporation or distillation is carried out at a reduced pressure (absolute pressure) of 300 Pa (2.25 mmHg) or less.
25. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate has a cation and anion total

content of 40 ppm or less.

26. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate has a cation and anion total  
5 content of 30 ppm or less.

27. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate is a product obtained by depolymerizing polyethylene terephthalate with ethylene  
10 glycol.

28. The purification process of claim 22, wherein the crude bis- $\beta$ -hydroxyethyl terephthalate is a product obtained by subjecting a reaction mixture obtained by depolymerizing  
15 polyethylene terephthalate with ethylene glycol to a cation removing treatment and/or an anion removing treatment.

29. The purification process of claims 7 or 28, wherein the reaction mixture is subjected to a decoloring treatment.  
20

30. Purified bis- $\beta$ -hydroxyethyl terephthalate having a cation and anion total content of 15 ppm or less.

31. The purified bis- $\beta$ -hydroxyethyl terephthalate of claim  
25 30, which has a cation and anion total content of 5 ppm or less.

32. The purified bis- $\beta$ -hydroxyethyl terephthalate of claim  
30, which has a bis- $\beta$ -hydroxyethyl terephthalate content of  
30 97 wt% or more.

33. Use of the purified bis- $\beta$ -hydroxyethyl terephthalate of claim 30 for the production of polyethylene terephthalate.

34. A process for producing polyethylene terephthalate by polymerizing the purified bis- $\beta$ -hydroxyethyl terephthalate of claim 30 in the presence of a polycondensation catalyst.
- 5 35. A process for producing polyethylene terephthalate by polymerizing the purified bis- $\beta$ -hydroxyethyl terephthalate of claim 30 and terephthalic acid in the presence of a polycondensation catalyst.